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W3F1-96-0140  
A4.05  
PR

August 15, 1996

U.S. Nuclear Regulatory Commission  
ATTN: Document Control Desk  
Washington, D.C. 20555

Subject: Waterford 3 SES  
Docket No. 50-382  
License No. NPF-38  
Review of Preliminary Accident Sequence Precursor Analysis

Gentlemen:

In a letter dated June 6, 1996, the NRC Staff requested that Waterford 3 review a copy of a preliminary Accident Sequence Precursor (ASP) analysis of an operational event which occurred at Waterford 3 on June 10, 1995. Waterford 3's comments on this analysis are included in Attachment 1 to this letter.

We appreciate the opportunity to provide comments on the referenced analysis. Should you have any questions or require additional information, please contact me at (504) 739-6242 or Tim Gaudet at (504) 739-6666.

Very truly yours,

J.J. Fisicaro  
Director  
Nuclear Safety

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cc: L.J. Callan (NRC Region IV)  
C.P. Patel (NRC-NRR)  
R.B. McGehee  
N.S. Reynolds  
NRC Resident Inspectors Office

## **ATTACHMENT 1**

### **Page 1 of Enclosure 1 - Event Summary**

#### **Change 2nd sentence to:**

"Delayed opening of the 4.16 kV auxiliary transformer (UAT) feeder breaker paralleled the grid with the main generator which was speeding up. The resulting out of phase condition caused an overvoltage and "fault level" currents which started a fire that damaged cables and switchgear for nonvital train A."

### **Page 1 of Enclosure 1 - Event Description**

#### **Change 1st paragraph, 3rd sentence to:**

"This actuation resulted in the trip of the main generator output breaker, the trip of the main generator exciter field breaker, the initiation of a fast dead bus transfer, and the trip of the main turbine."

#### **The 2nd paragraph, 3rd sentence is not correct.**

There is nothing to support the UAT tripping on overcurrent. The overcurrent relays were set to trip @ >1 second for a current of 30000 amps. The event was less than 29000 amps for approximately 0.3 seconds. The power would not have been lost to the A2 bus unless the SUT breaker had also tripped.

### **Page 2 of Enclosure 1 - Event Description**

#### **Change 1st paragraph, 1st sentence:**

Delete the word "sensed". It implies that the RCP speed had not dropped. The RCP was slowing down due to the loss of power to the A1 bus. The A1 bus did not transfer.

#### **Change 2nd paragraph, 2nd sentence to:**

"EDG A started and re-energized the required safety-related loads via the load sequencer."

#### **Move the 4th paragraph, 1st sentence:**

The A1 bus de-energized and all of its loads de-energized at the beginning of the event. This sentence should be moved to the beginning of the event.

**Change the 4th paragraph, 2nd sentence to:**

"At 0935 hours (+37 min) the TGB..."

**Change the 4th paragraph, 3rd sentence to:**

"... which resulted in a voltage across the breaker during opening which was beyond the breaker's design."

**Change the 5th paragraph, 1st sentence to:**

"... dispatched the fire brigade,..."

## **Page 3 of Enclosure 1 - Event Description**

### **Paragraph 1**

The recommendation to use water was not made solely by the Volunteer Fire Department. The decision to use water was the result of a methodical analysis performed by the Waterford 3 Fire Brigade Leader and the Voluntary Fire Department Chief. Also, the Fire Brigade was not "reluctant" to use water. They had been trained to consider gas and dry chemical as the preferred options.

**Change the 2nd paragraph, 2nd sentence to:**

"42 min after the 6.9 kV..." The 6.9 kV bus de-energized at 0858 hours when the transfer to the Startup Transformer (SUT) failed.

**The 2nd paragraph, last sentence is not correct:**

The two circulating water pumps de-energized at 0858 hours. This implies that it occurred much later.

**Change the 5th paragraph, 2nd sentence to:**

"...to the reservoir for SI-405B,..."

## **Page 4 of Enclosure 1 - Event Description**

**Change 1st complete paragraph, 1st sentence to:**

"When valve SI-405A was tested..."

**Change 1st complete paragraph, 3rd sentence to:**

"...June 13, 1995."

## **Page 4 of Enclosure 1- Additional Event-Related Information**

**Change 1st paragraph, 1st sentence to:**

"The Waterford 3 fast dead bus..."

**Change 1st paragraph, 2nd sentence to:**

"During a fast dead bus transfer, the UAT feeder breakers to the A1 and B1 6.9 kV and the A2 and B2 4.16 kV buses are designed to open in five cycles and the SUT feeder breakers are designed to close in seven cycles, resulting in a two cycle nominal deadband on the respective buses."

**Change 2nd paragraph, 1st sentence to:**

"The scheme is a "simultaneous" (trip and close signals given simultaneously with no interlock) bus transfer (zero to two cycle deadband) instead of the "sequential" (the 'tripping' breaker interlocked with the 'closing' breaker) bus transfer..."

**Change 2nd paragraph, 4th sentence to:**

"The Waterford 3 design does not include..."

**Change 3rd paragraph, 2nd sentence to:**

"...than the system frequency due to load rejection."

**Change 3rd paragraph, 3rd sentence to:**

"When the UAT breaker opened, the main generator was approaching 180 degrees out of phase with the system (~8 kV across the breaker). The current interrupted was ~28800 amps."

**Change 3rd paragraph, 4th sentence to:**

"This overvoltage due to the out of phase condition and the overcurrent resulted in an..."

## **Page 5 of Enclosure 1 - Additional Event-Related Information**

**Change 2nd complete paragraph, 2nd sentence to:**

"Two cubicles (the failed breaker was an end cubicle) were heavily damaged and approximately ten feet of the cable bus duct were destroyed."

**Statements in the 2nd complete paragraph are in error:**

The design of the Calvert Bus used at Waterford 3 does not employ the use of "fire stops". Thus, the statement regarding the ineffectiveness of the vertical fire stops is inaccurate. Additionally, the statement that fire damage was limited by the fire stop in the horizontal section is also inaccurate.